Experiences with Traditional WIM Sensors in Kentucky

KENTUCKY TRANSPORTATION CABINET

NATMEC 2002 ICWIM

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Kentucky
Transportation
Cabinet

Division of Planning

Sensors

- Capacitance Mat
- Rigid Channel Piezo
- Bare Piezo
- Bending Plate
- Load Cell

Capacitance Mat

- Do wear out.
- Water destroys.
- Use permanent loops if possible.
- Use Tap-Con screws
- Lots of bitchethene tape

Capacitance Mat

Typical Mat installations

Rigid Channel Piezo

- Stay in concrete well
- Need good grout
- Tend to pop out of pavement especially rutted asphalt
- Not easily "held" in slot during epoxy cure time

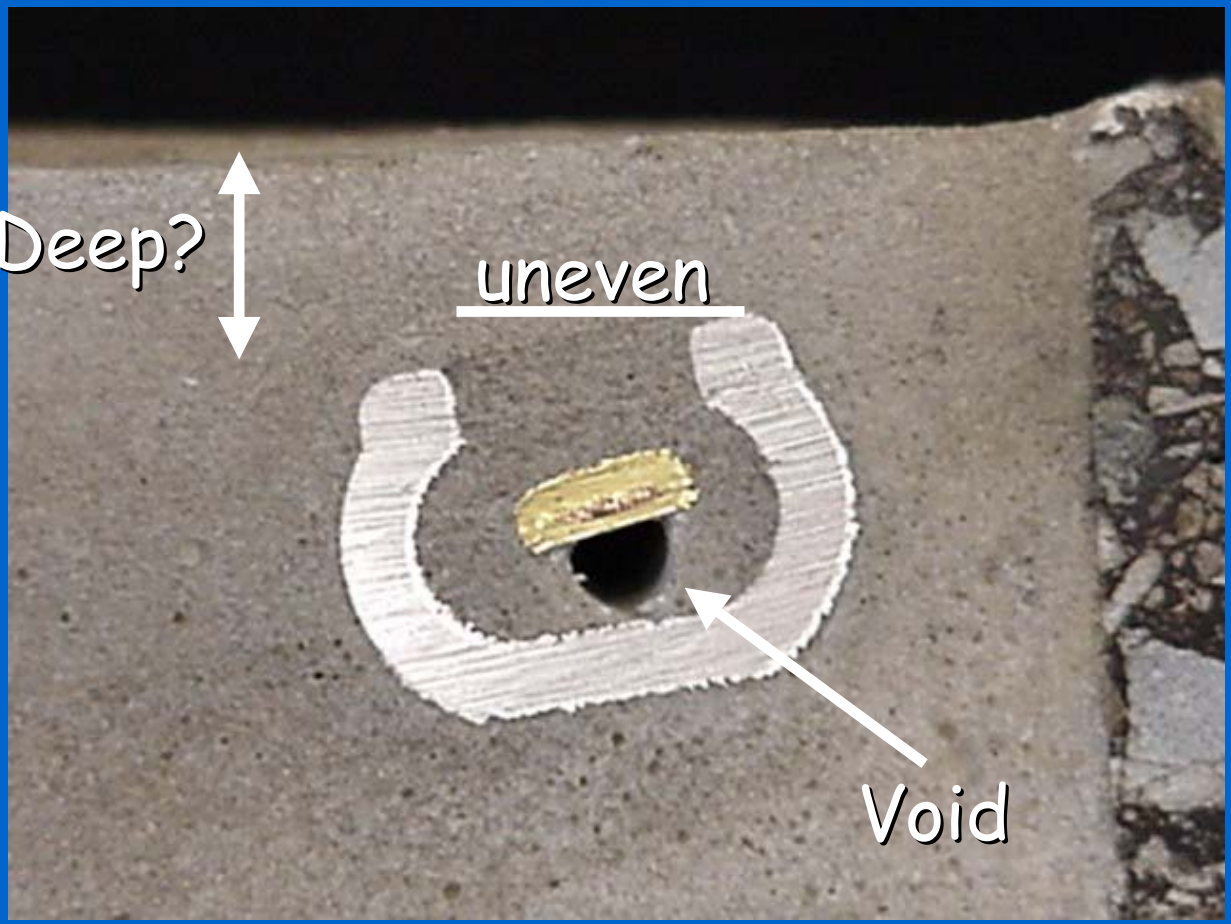
Rigid Channel Piezo

This sensor has been working for more than six years!

Rigid Channel Piezo

This sensor has not.

Rigid Channel Piezo

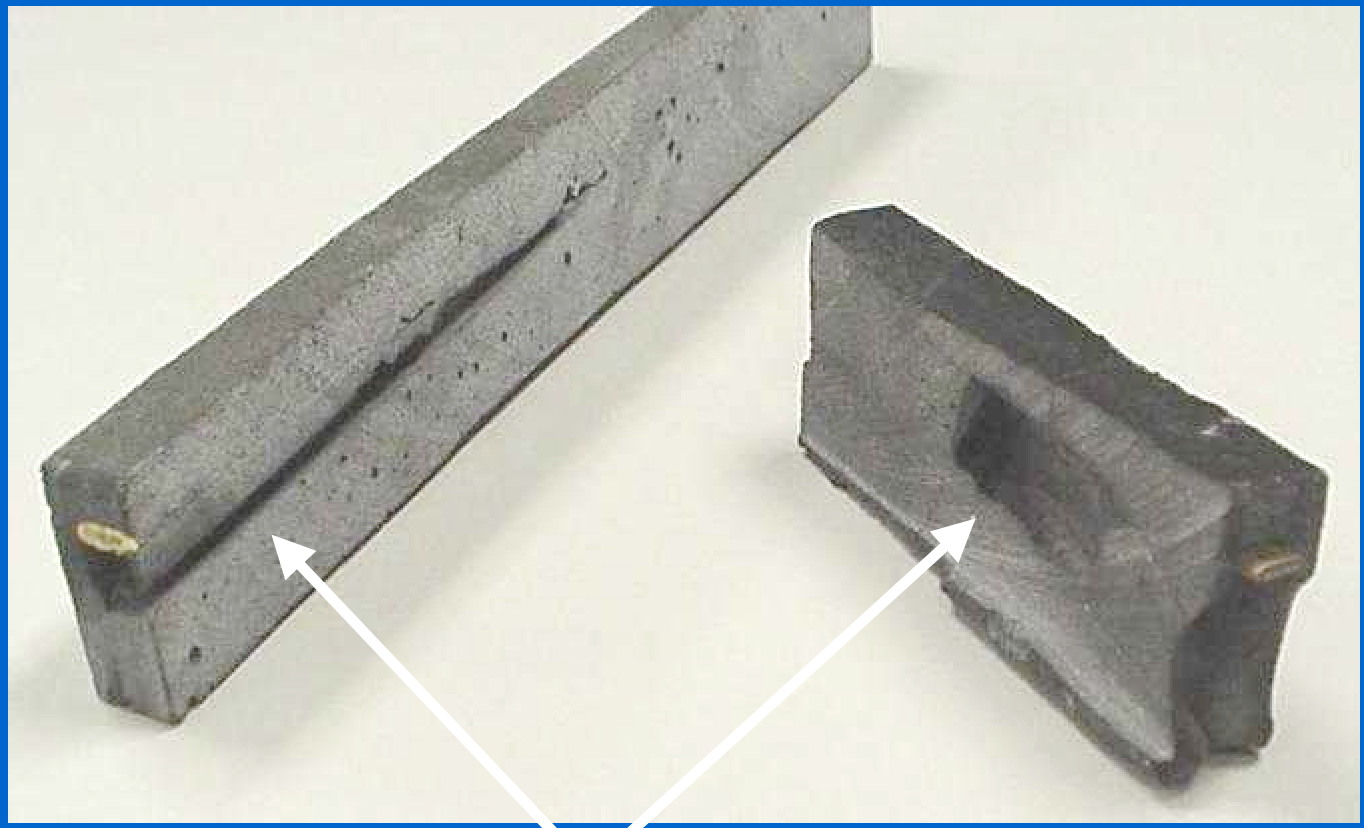


Rigid Channel Piezo

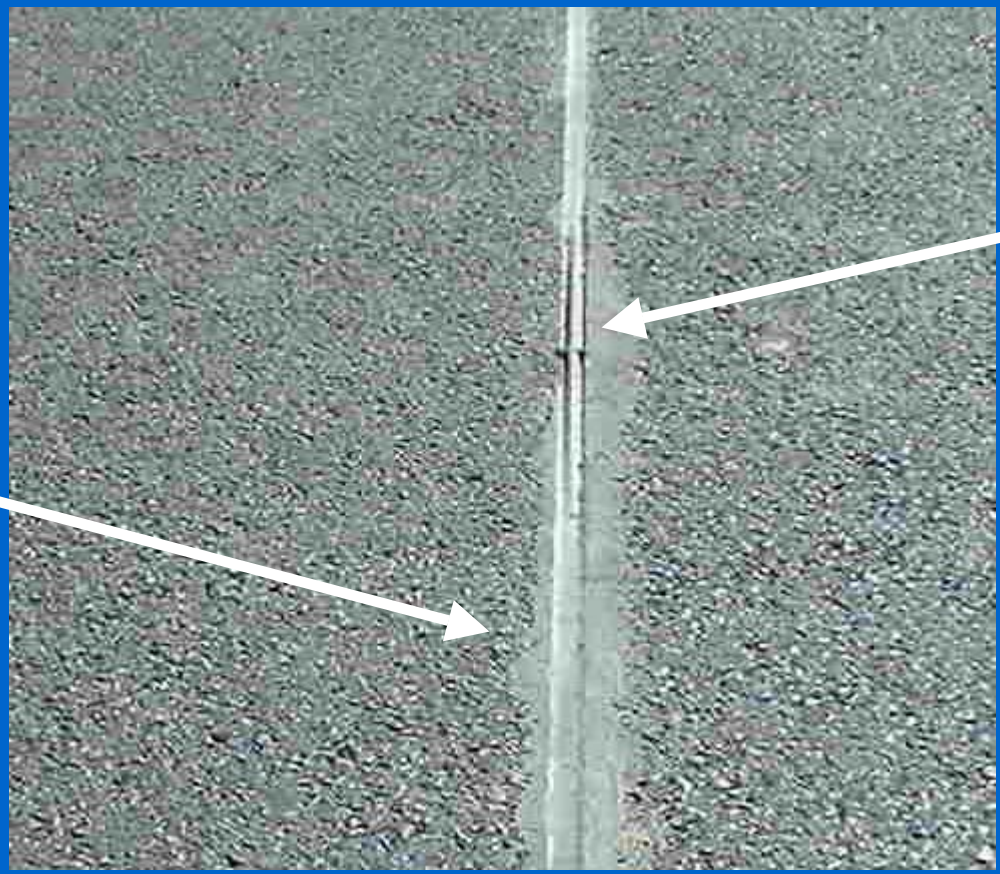
Bare Piezo

- Easily installed
- Installs quickly
- Small saw slot
- Can be used in portable applications

Bare Piezo



Bare Piezo



Bending Plate - Load Cell

- Have plenty of finishers available when using 'high-early" concrete
- Don't pour concrete directly on frames
- Pour sides and vibrate
- Tie rebar tight
- Make sure water drains to the ditch and not to the cabinet through conduit

Bending Plate - Load Cell

- Always make sure you tamp the bottom of the pit
- Use joint sized epoxy coated rebar
- Don't bore under asphalt to concrete
- Don't expect a more expensive WIM systems to compensate for poor road characteristics

Bending Plate

Typical Bending Plate installations

Load Cell

Typical Load-cell installations

Common to all

Three types of installed sensors

Common to all

The Good

- Work all the time
- Have worked for years
- Doesn't matter what the installation looks like

Common to all

The Bad

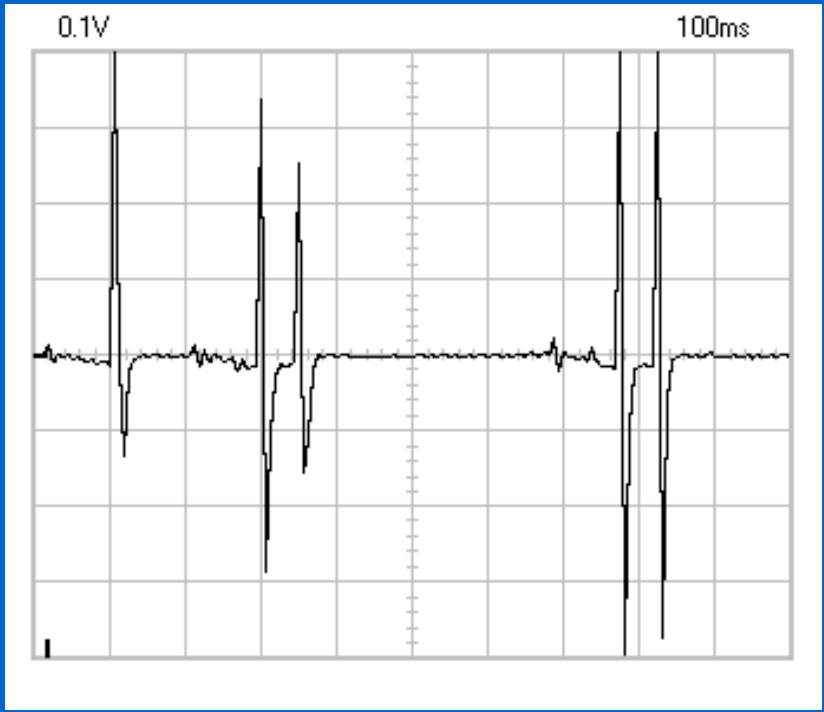
- Don't work
- Can't get it to work
- Doesn't matter what the installation looks like

Common to all

The Ugly

- Only works when you are there
- Checks out OK
- The installation usually looks good

Common to all



Invest in a good Digital Storage Oscilloscope

Common to all

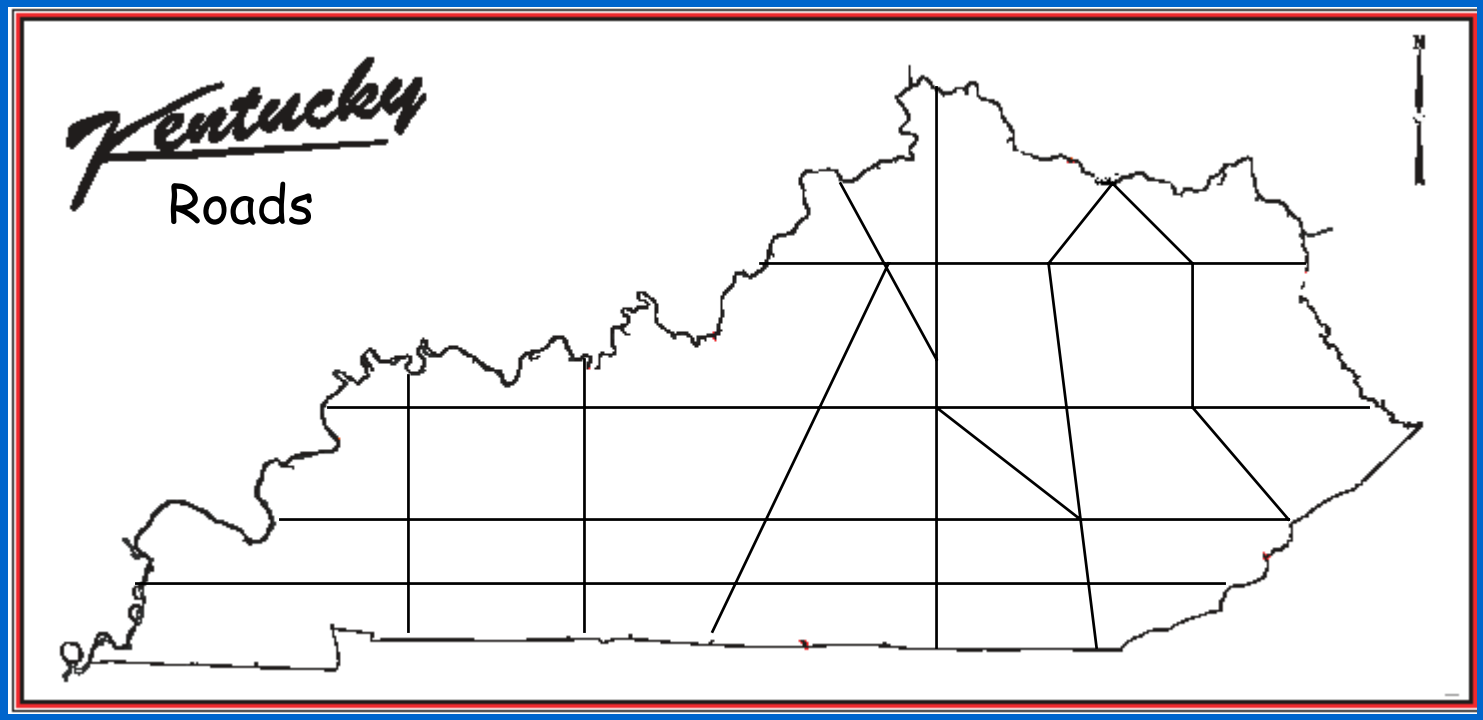
Contractors

Common to all

Roadway Considerations

- Straight
- Smooth
- Level
- "Good" surface
- No rutting
- ASTM WIM spec

Common to all



Common to all

Installation

- Have detailed plans
- Have an "expert" on site
- Keep future repairs in mind

Common to all

Note all lead-in slots converge to one point.

This makes future installations and repairs difficult.

Common to all

Avoid wheel track "triangles"

Common to all

Common to all

Drill one-inch holes in corners

Run lead-in Straight to pull box

Common to all

Don't forget maintenance to other components at site.

Common to all

Plan the work

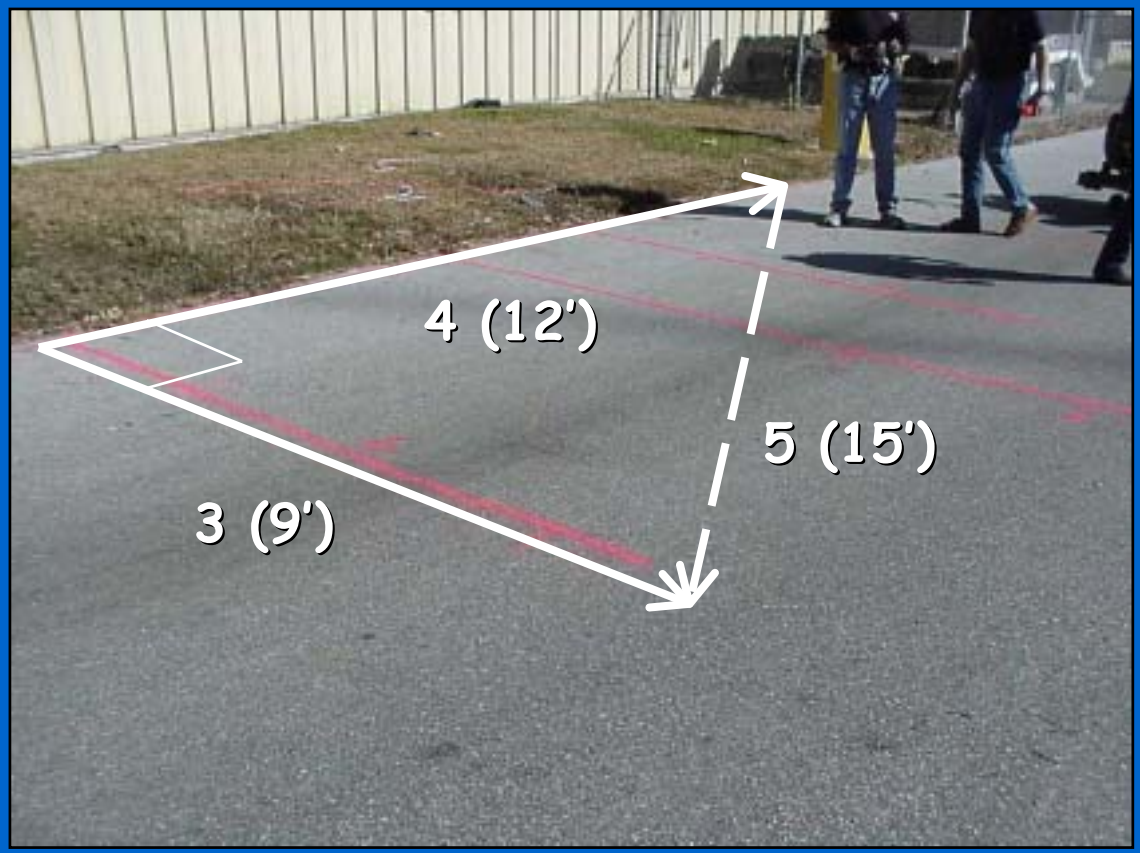
- Know where everything is going to go
- Mark all saw cuts before starting the saw
- The more wires in a slot, the deeper it has to be

Common to all

Plan the work

- Accurately measure/layout straight lines perpendicular to traffic flow
- Cut accurate, straight slots
- Always "wet" cut

Common to all



Don't just "eyeball it". **Measure it!** It can be easily accomplished by constructing a 3-4-5 triangle.

Common to all

Thoroughly clean all slots to remove any debris, sludge, etc.

Use high pressure washer

Then dry with oil free compressed air

Use wire brush

Common to all

Sensor crossings should be 1-2mm high, lightly feathered. NO DIPS!!! (Dip = Loss of Signal)

Common to all

The contractor didn't smile...

when he had to replace this "smile".

Common to all

Loops were installed in base.

Common to all

When driving surface was put down it did not adhere to loop sealant. Neatness counts.

Future Directions

- Fiber Optic sensors
- Piezo-quartz
- ??

Thank You